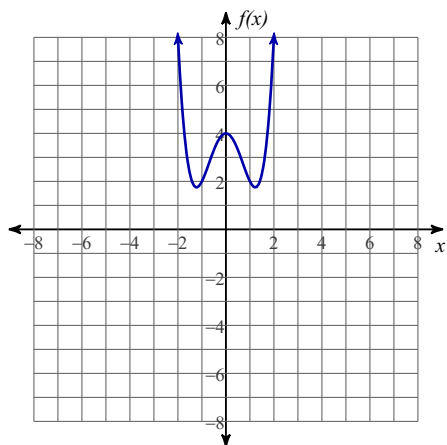


Unit 1 Review 1

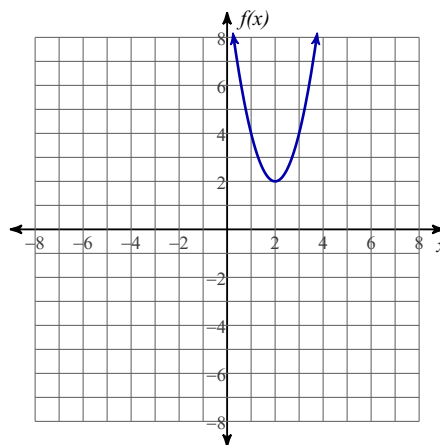
Date _____ Period _____

Approximate all points of relative and absolute extrema of each function.

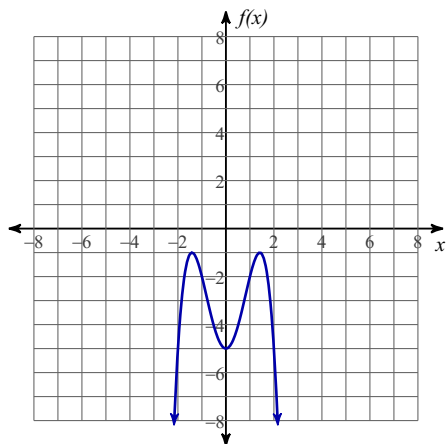
1)



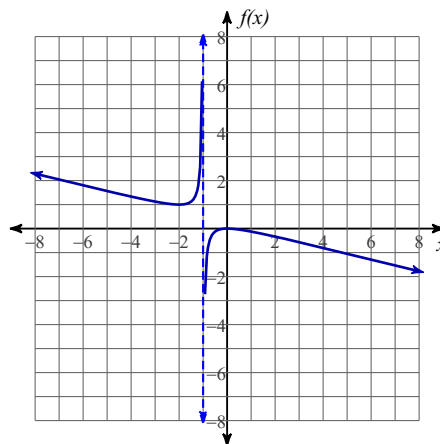
2)

**Approximate the intervals where each function is increasing and decreasing.**

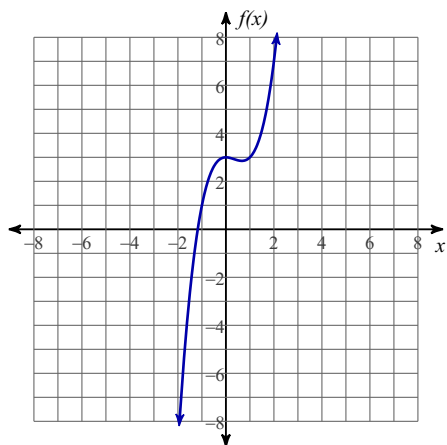
3)



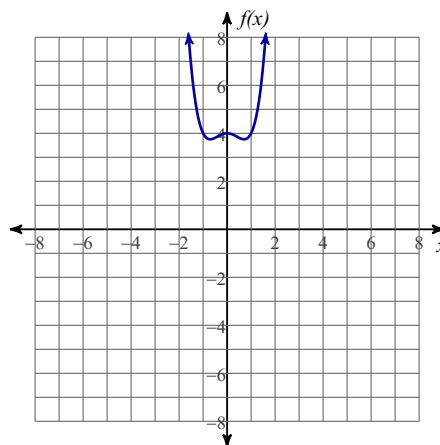
4)

**Approximate all points of relative and absolute extrema of each function. Then approximate the open intervals where each function is increasing and decreasing.**

5)

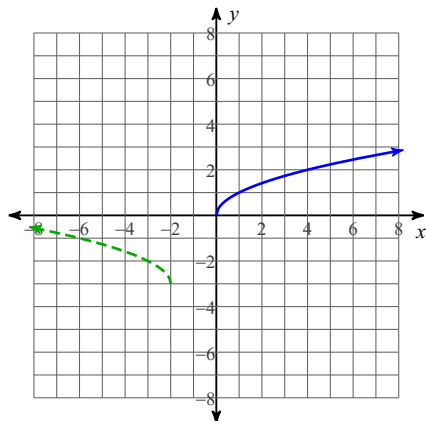


6)

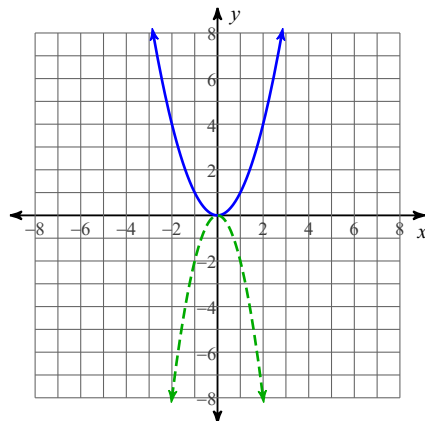


Write $g(x)$ (dashed line) in terms of $f(x)$ (solid line).

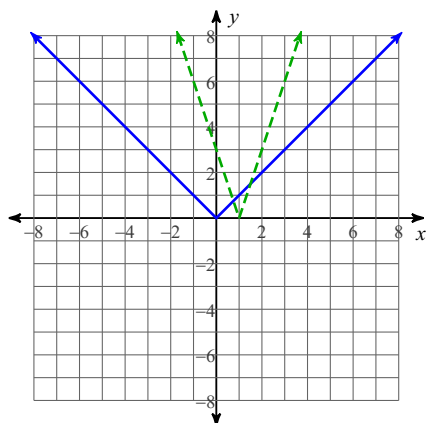
7)



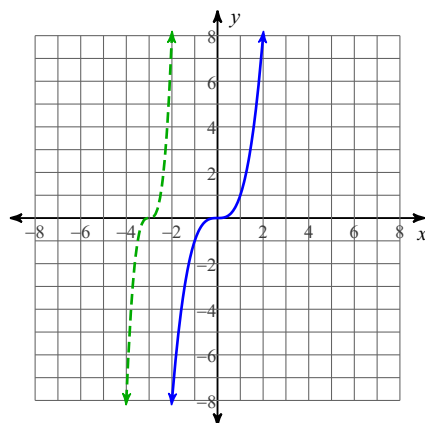
8)



9)



10)



Describe the transformations necessary to transform the graph of $f(x)$ into that of $g(x)$.

11) $f(x) = x^2$
 $g(x) = -(x+2)^2 + 3$

12) $f(x) = x^3$
 $g(x) = (2(x-1))^3 - 3$

13) $f(x) = |x|$
 $g(x) = -|x-3| - 2$

14) $f(x) = x^3$
 $g(x) = -(3x)^3 + 1$

Sketch the graph of each function.

15) $g(x) = -\frac{1}{3(x-3)} + 2$

16) $g(x) = -\frac{1}{2} \cdot |x-3| + 1$

17) $g(x) = -(2(x+3))^2 - 2$

18) $g(x) = -\frac{1}{3}\sqrt{-(x+2)} + 2$

Transform the given function $f(x)$ as described and write the resulting function as an equation.

- 19) $f(x) = x^3$
 compress vertically by a factor of 3
 reflect across the x-axis
 translate left 3 units
 translate up 1 unit

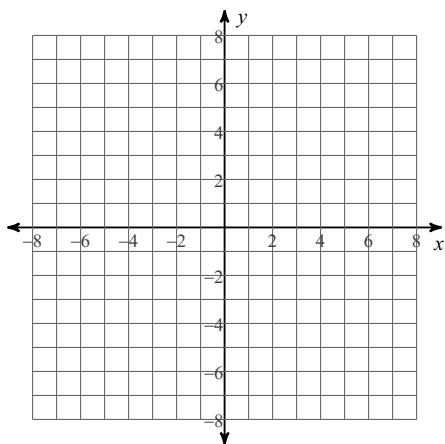
- 20) $f(x) = \sqrt{x}$
 compress horizontally by a factor of 2
 reflect across the y-axis
 reflect across the x-axis
 translate right 2 units
 translate up 1 unit

- 21) $f(x) = \frac{1}{x}$
 expand vertically by a factor of 2
 reflect across the x-axis
 translate right 1 unit
 translate down 3 units

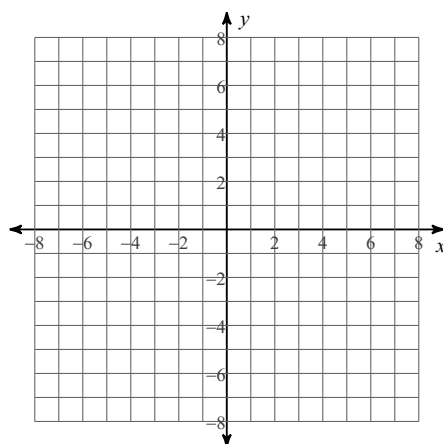
- 22) $f(x) = \sqrt{x}$
 reflect across the y-axis
 compress vertically by a factor of 3
 reflect across the x-axis
 translate right 2 units
 translate up 3 units

Sketch the graph of each function.

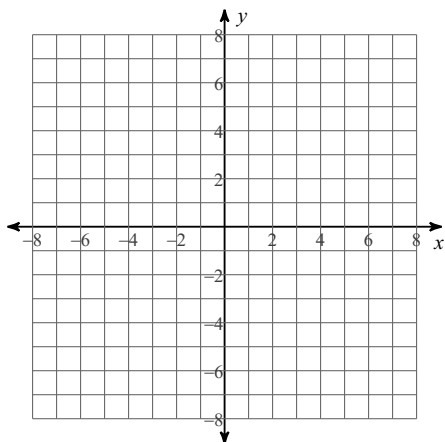
23) $f(x) = \begin{cases} -3, & x \leq 4 \\ (x-4)^2, & x > 4 \end{cases}$



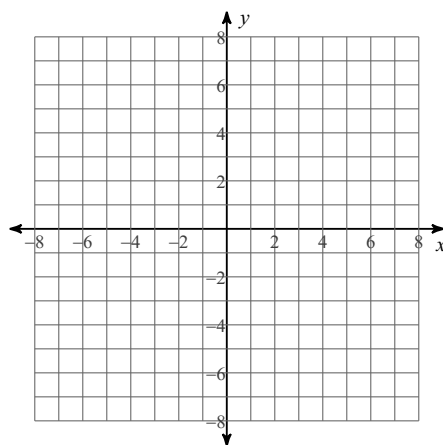
24) $f(x) = \begin{cases} (x+3)^2, & x \leq -2 \\ |x|, & x > -2 \end{cases}$



25) $f(x) = \begin{cases} -2^x, & x < -4 \\ \frac{1}{x} + 2, & -4 \leq x < 4 \\ -|x|, & x \geq 4 \end{cases}$



26) $g(x) = \begin{cases} \frac{1}{x-2}, & x \leq 2 \\ \frac{1}{x}, & x > 2 \end{cases}$



Perform the indicated operation.

27) $f(n) = n^2 + 5n$
 $g(n) = n - 2$
Find $\left(\frac{f}{g}\right)(n)$

28) $g(x) = x - 3$
 $h(x) = 3x + 1$
Find $(2g - 5h)(x)$

29) $g(x) = 3x - 1$
 $h(x) = x^2 + 3$
Find $(g + h)(x)$

30) $g(n) = n^2 - n$
 $f(n) = 4n$
Find $(g \circ f)(n)$

31) $h(a) = a^2 + 3a$
 $g(a) = 2a + 3$
Find $(h \circ g)(2)$

32) $h(t) = 3t + 2$
 $g(t) = t^2 - 5t$
Find $\left(\frac{h}{g}\right)(9)$

33) $h(n) = 3n - 5$
 $g(n) = -4n + 4$
Find $(h - g)(-2)$

34) $h(t) = 2t - 4$
 $g(t) = t^2 - 5 + 2t$
Find $(h \circ g)(1)$

35) $g(a) = -2a + 2$
 $h(a) = a^2 - 2$
Find $(g - h)(-3 - a)$

36) $g(x) = 3x + 1$
 $f(x) = 4x - 1$
Find $(g \cdot f)(-4x)$

37) $g(a) = a + 5$
 $h(a) = a^2 + 4a$
Find $(g - 3h)\left(\frac{a}{2}\right)$

38) $f(x) = 3x + 2$
 $g(x) = x^2 - 4$
Find $(f - g)(4x)$

Find the inverse of each function.

39) $g(n) = \sqrt[3]{n + 2} - 2$

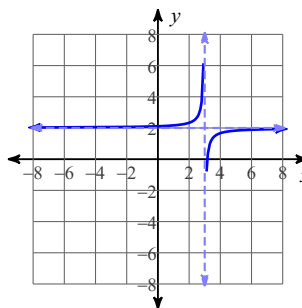
40) $g(x) = \sqrt[3]{-x - 3}$

41) $f(x) = \frac{2}{x}$

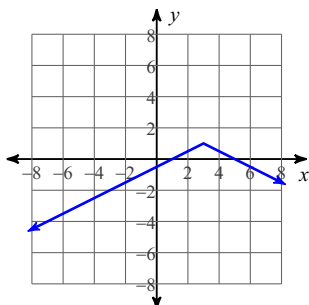
42) $g(x) = -\frac{4}{-x - 1} - 2$

Answers to Unit 1 Review 1 (ID: 1)

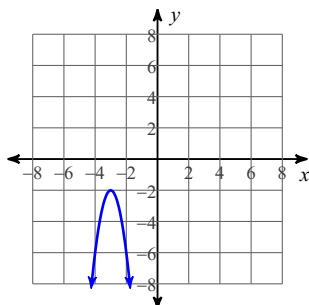
- 1) Absolute minima: $(-1.2, 1.8), (1.2, 1.8)$ 2) Absolute minimum: $(2, 2)$
 Relative maximum: $(0, 4)$ No absolute or relative maxima.
- 3) Increasing: $(-\infty, -1.4), (0, 1.4)$ Decreasing: $(-1.4, 0), (1.4, \infty)$
- 4) Increasing: $(-2, -1), (-1, 0)$ Decreasing: $(-\infty, -2), (0, \infty)$
- 5) Relative minimum: $(0.7, 2.9)$
 Relative maximum: $(0, 3)$
 Increasing: $(-\infty, 0), (0.7, \infty)$ Decreasing: $(0, 0.7)$
- 6) Absolute minima: $(-0.7, 3.8), (0.7, 3.8)$
 Relative maximum: $(0, 4)$
 Increasing: $(-0.7, 0), (0.7, \infty)$ Decreasing: $(-\infty, -0.7), (0, 0.7)$
- 7) $g(x) = f(-(x+2)) - 3$ 8) $g(x) = -2f(x)$ 9) $g(x) = 3f(x-1)$
- 10) $g(x) = f(2(x+3))$ 11) reflect across the x-axis
 translate left 2 units
 translate up 3 units
- 12) compress horizontally by a factor of 2
 translate right 1 unit
 translate down 3 units
- 13) reflect across the x-axis
 translate right 3 units
 translate down 2 units
- 14) compress horizontally by a factor of 3
 reflect across the x-axis
 translate up 1 unit
- 15)



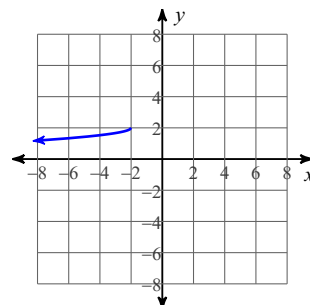
16)



17)



18)



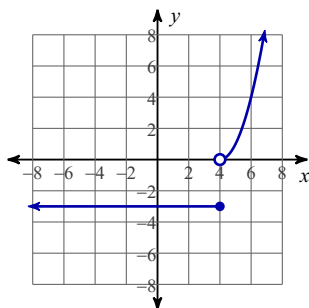
19) $g(x) = -\frac{1}{3}(x+3)^3 + 1$

20) $g(x) = -\sqrt{-2(x-2)} + 1$

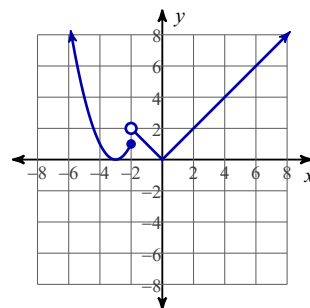
21) $g(x) = -\frac{2}{x-1} - 3$

22) $g(x) = -\frac{1}{3}\sqrt{-(x-2)} + 3$

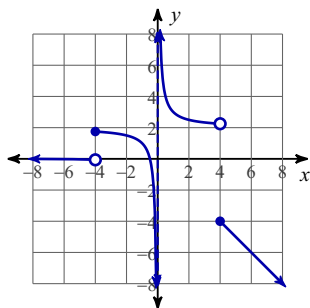
23)



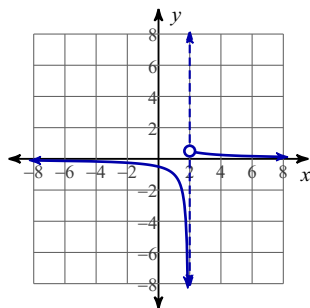
24)



25)



26)



27) $\frac{n^2 + 5n}{n - 2}$

28) $-13x - 11$

29) $x^2 + 3x + 2$

30) $16n^2 - 4n$

31) 70

32) $\frac{29}{36}$

33) -23

34) -8

35) $-a^2 - 4a + 1$

36) $192x^2 - 4x - 1$

37) $\frac{20 - 22a - 3a^2}{4}$

38) $-16x^2 + 12x + 6$

39) $g^{-1}(n) = (n + 2)^3 - 2$

40) $g^{-1}(x) = -x^3 - 3$

41) $f^{-1}(x) = \frac{2}{x}$

42) $g^{-1}(x) = \frac{4}{x + 2} - 1$